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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,174	11/14/2003	Atsuhiko Sakurai	TI-35272	2911
23494	7590	01/12/2010		
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EXAMINER				
SAINT CYR, LEONARD				
ART UNIT		PAPER NUMBER		
2626				
NOTIFICATION DATE		DELIVERY MODE		
01/12/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com

### Office Action Summary

**Application No.**

10/714,174

**Applicant(s)**

SAKURAI ET AL.

**Examiner**

LEONARD SAINT CYR

**Art Unit**

2626

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3, 5, 6, 8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 6 and 8 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/14/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 10/02/09 have been fully considered but they are not persuasive.

Applicant argues that neither Laroche et al., (1999) nor Laroche (300) teach or suggest calculating a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the corresponding dominant spectral line; calculating a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm (Amendment, pages 7 - 9).

The examiner disagrees, since Laroche et al., (1999) discloses that "the neighboring channels can be synchronized to the peak, and the identity phase-locking equation can be generalized as...**For each channel around the peak channel, calculate analysis phase difference between peak and current channel, and calculate current synthesis phase using (16)**" [page 330, col.1; equation 16 shows that non-dominant peaks have a different phase calculation than dominant peaks]

Applicant argues that neither Laroche et al., (1999) nor Laroche (300) teach or suggest merging nearby spectral lines that are within a predetermined frequency range of each other prior to calculating the phase difference (Amendment, pages 9, and 10).

The examiner disagrees, since Laroche et al., disclose **"for a constant-frequency sinusoid, successive short-time signals will overlap coherently...for constant-frequency sinusoids, the phase unwrapping yields a good estimate of the instantaneous frequency** if channel k is influenced by only one sinusoid, and if the analysis window's cutoff frequency,  $w1...$ " (page 325, col.1, paragraphs 2, and 3).

Applicant argues that claims 1, 3, and 5 recite statutory subject matter, since now recite "receiving input digital audio data having a first time scale; converting the digital audio signal into an audio signal having a second time scale according to the desired time scale modification (Amendment, page 6).

The examiner disagrees, since those two new steps are also considered as abstract ideas.

### ***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

**Claims 1, 3, and 5** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As per the most recent interpretation of the Interim Guidelines regarding 35 U.S.C. 101, claims **1 - 5** define non-statutory processes because they merely manipulate an abstract idea (mathematical algorithm) without a claimed limitation to produce a useful, concrete, tangible result. If the acts of a claimed process manipulate only numbers, abstract concepts or ideas, or

signals representing any of the foregoing, the acts are not being applied to appropriate subject matter (Benson, 409 U.S. at 71-72, 175, USPQ at 676). Furthermore, claims define nonstatutory processes if they simply manipulate abstract ideas (Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759). As for guidance to areas of statutory subject matter, see 35 U.S.C. 101 Interim Guidelines (with emphasis of the Clarification of Interim Guidelines For Examination of Patent Applications for Subject Matter Eligibility); as an example, in Alappat, the claimed output smooth waveform (consisted of lighting pixels on an oscilloscope/display) is a useful, concrete, tangible, final result; in Arrhythmia, the claimed useful, concrete, tangible, final result represented the condition of a patient's heart; in State Street, the claimed useful, concrete, tangible, final result was data output that represented a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent.

Claims **1, 3, and 5** reviewed in light of the specification, simply recite an abstract idea for converting digital audio signal.

As can be seen by claims **1, 3, and 5** these claims recite an abstract idea by setting forth the step of "calculating a phase difference for the dominant spectral line of each spectral band by a phase vocoder algorithm; calculating a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the corresponding dominant spectral line; calculating a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm" These steps are abstract in nature.

It is readily apparent that when claims **1, 3, and 5** are each taken as a whole, the claims are directed to the preemption of an abstract idea, and thus are non-statutory.

**Claims 1, 3, and 5** are rejected under 35 USC 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps to be performed, a statutory process under 35 USC 101 must be tied to another statutory category (such as a manufacture or a machine) or transform underlying subject matter (such as an article or material) to a different state or thing. The steps in those claims can be performed manually without the use of a particular machine. Those claims could be done in a piece of paper, by using digital signal processing (DSP) theory to derive all the values recited in the claims. Thus, claims **1, 3, and 5** do not define a statutory process.

***Claim Rejections - 35 USC § 103***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1, 3, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laroche (Improved Phase Vocoder Time-Scale modification of Audio, IEEE, 1999) in view of Laroche (US Patent 6, 766,300).

Regarding claims 1, and 6, Laroche (1999) discloses a method/apparatus of converting an input digital audio signal into an output digital audio signal having a modified time scale comprising the steps of:

receiving input digital audio data having a first time scale ("time scale...in the audio and speech"; page 323, col.1, paragraph 2)

calculating a discrete Fourier transform of first equally spaced, overlapping time windows having a first overlap amount of the input digital audio signal ("N is the size of the discrete Fourier transform...correspond to overlapping"; page 324, col.1, section A – col.2, paragraph 1);

partitioning the spectrum into a plurality of contiguous spectral bands ("the windowed short-time signals"; page 324, col.1, section A – col.2, paragraph 1);

identifying a dominant spectral line having the greatest magnitude within each spectral band ("searched local maxima...dominant peak"; page 329, col.1, paragraphs 2, and 3);

calculating a phase difference for the dominant spectral line of each spectral band by a phase vocoder algorithm ("**phase difference**"; page 329, col.1, paragraph 3; page 330, col.1, last 15 lines);

calculating a phase difference for each of a predetermined number of spectral lines near the dominant spectral line within each spectral band as the phase difference of the corresponding dominant spectral line; calculating a phase difference for other spectral lines of each spectral band by the phase vocoder algorithm ("**calculate analysis phase difference between peak and current channel, and calculate current synthesis phase using (16)**"; see also the steps of the scaled-phase-locking scheme summary; page 329, col.1, paragraph 3; page 330, col.1, last 15 lines); and

calculating an inverse discrete Fourier transform resulting in equally spaced, overlapping time windows having a second overlap amount employing the calculated phase difference for each spectral line, the second overlap selected having a ratio to the first overlap amount to achieve a desired time scale modification ("**resynthesis stage...obtained by inverse-Fourier-transform...**satisfy strong consistency conditions...correspond to overlapping short-time signals"; page 324, col.1, section A, paragraph 2 –col.2, paragraph 1);

converting the digital audio signal into an audio signal having a second time scale according to the desired time scale modification ("pitched signals such as speech...performing time-scale modification"; page 331, col.2, paragraph 1).

However, Laroche (1999) does not specifically teach partitioning the spectrum into a plurality of contiguous spectral bands according to a Bark scale where each spectral band has an extent dependent upon human frequency perception.

Laroche (300) teaches that the duration of the window size and the size of the Fourier transform are usually set to 3 to 5 ms, which gives uniform frequency bands of about 300 Hz; a better sub-band decomposition could be used using frequency bands uniform in a bark scale (col.3, lines 51 - 58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to used bark scale frequency division as taught by Laroche (300) in Laroche (1999), because that would help better divide the spectrum in better uniform frequency bands (col.3, lines 53 – 55).



Regarding claims 3, and 8, Laroche (1999) further suggests merging nearby spectral lines that are within a predetermined frequency range of each other prior to calculating the phase difference ("**short-time signals will overlap coherently...overlap-adding small segment of waveform**"; page 330, col.2, last five lines; page 325, col.1, paragraph 2).

#### ***Allowable Subject Matter***

5. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter:

As to Claim 10, neither Laroche (300) nor Laroche (1999) teach or suggest partitioning the spectrum into a plurality of contiguous spectral bands includes adjusting boundaries of spectral bands to maintain important frequency groups within the same spectral band.

#### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEONARD SAINT CYR whose telephone number is (571) 272-4247. The examiner can normally be reached on Mon- Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571) 272-7602. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or (571)-272-1000.

LS

12/28/09

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